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December 20, 2010

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Ms. Deb Aja, Western District Supervisor
North Carolina Department of Environment and Natural Resources
Division of Waste Management
2090 U.S. Highway 70
Swannanoa, NC 28778

SOLID WASTE SECTION
ASHEVILLE REGIONAL OFFICE

Reference: **WASTE MANAGEMENT PLAN**
Belews Creek Steam Station
Flue Gas Desulfurization (FGD) Residue Landfill - Permit #85-05
Phase 1, Cell 1
Stokes County, North Carolina
S&ME Project No. 1411-09-097

Dear Ms. Aja:

On behalf of Duke Energy (Duke), S&ME, Inc. submits this Waste Management Plan for the Belews Creek Steam Station Flue Gas Desulfurization (FGD) Residue Landfill Phase 1, Cell 1 Permit #85-05 as required by GS 130A-309.09D.

If there are any questions regarding this report, please contact me at 828-687-9080, Ext. 315.

Sincerely,
S&ME, Inc.

William M. Miller, PE
Senior Project Engineer

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Industrial Waste Landfill
Waste Management Plan
December 20, 2010

Belews Creek Steam Station
Flue Gas Desulfurization (FGD) Residue
Landfill Phase 1, Cell 1
Permit #85-05

cc: Duke Energy Belews Creek Steam Station
3195 Pine Hall Rd
Belews Creek, NC 27042
Attn: Melanie Martin

Duke Energy Belews Creek Steam Station
3195 Pine Hall Rd
Belews Creek, NC 27042
Attn: Kimberlee Benson, P.E.

Duke Energy
PO Box 1006
Charlotte, NC 28201-1006
Attn: Ed Sullivan, P.E. Mail Code EC13K

Facility Name Belews Creek Steam Station FGD Residual Landfill,
Phase 1
Permit # 85-05
Location Stokes County
Permit Issuance Date January 24, 2008. The permit is subject to review every
five years.

Waste Management Plan Period

The Belews Creek FGD Residue Landfill Phase 1 has a net landfill capacity¹ of 1,614,000 cubic yards. This capacity corresponds to a volume of 1,775,817 tons of gypsum placed at a unit weight of 89 lb/ft³.

The period of the Waste Management Plan presented is for a five year period.

Description of Waste Disposed in Landfill

The landfill is permitted to receive the following types of material:

- Flue gas desulfurization (FGD) by-products (gypsum);
- Wastewater treatment clarifier sludge

The waste water treatment clarifier sludge is disposed in the Craig Road Ash Landfill (Permit 85-04) and is not placed in this landfill.

Expected Annual Waste Quantities For Five Year Phase

As described in the Construction Plan Application² Section 5.2, the landfill was designed to receive approximately 456,570 tons (380,000 cubic yards) of gypsum by-product each year and approximately 50,000 tons of clarifier sludge per year. The clarifier sludge is disposed in the Craig Road Ash Landfill (Permit 85-04) and is not placed in this landfill.

The table below presents the quantities of waste that have been placed or that are expected to be placed in the landfill. The yearly periods listed below correspond to the period July 1 through June 30 for the respective year.

Table 1 Quantities of Waste Placed in Landfill

Year	Period	Annual Quantity (Actual or Expected)
Year 1	2007-2008	64,980.06 tons (Actual)
Year 2	2008-2009	139,996.24 tons (Actual)
Year 3	2009-2010	278,794.69 tons (Actual)
Year 4	2010-2011	456,570 tons (Expected)
Year 5	2011-2012	456,570 tons (Expected)

¹ Net landfill capacity is volume of space below final cover system and above operational cover system.

² Construction Plan Application FGD Residue Landfill, Duke Energy Corp. Belews Creek Steam Station, Stokes County, NC, Chas. H. Sells, Project 046119, September 30, 2005.

The values for the actual Annual Quantity of waste placed in the landfill, presented in Table 1, were obtained from the NCDENR Industrial Waste Landfill Facility Annual Reports for the respective years.

Expected Years of Disposal Capacity

The landfill was designed to receive approximately 456,570 tons of gypsum by-product each year. As stated in the Construction Plan Application, the net landfill capacity is 1,614,000 cubic yards. This volume corresponds to 1,775,817 tons of gypsum placed at a unit weight of 89lb/ft³.

As of June 30, 2010 the landfill had received approximately 483,771 tons of gypsum. The remaining capacity of the landfill is calculated below:

$$\begin{array}{rcl} 1,775,817 \text{ tons} & \text{Phase 1 Net Landfill Capacity} & \\ -483,771 \text{ tons} & \text{Waste Placed through June 30, 2010} & \\ \hline 1,292,046 \text{ tons} & \text{Phase 1 Remaining Capacity} & \end{array}$$

The quantity of FGD residue (gypsum) generated depends on factors such as the sulfur content of the coal, the BTU content of the coal, and the quantity of coal burned. These factors typically will vary over the course of a single year. This variation will cause the quantity of FGD residue produced and disposed in the landfill to vary over time.

Based on the approximate tons of waste placed through June 30, 2010 and the design disposal rate, the estimated years of disposal capacity remaining are calculated:

$$\frac{1,292,046 \text{ tons Remaining Capacity}}{456,700 \text{ tons/year Expected Annual Quantity}} = 2.8 \text{ Years of Disposal Capacity Remaining}$$

Options for Management and Reduction of Wastes

Belews Creek generates 2240 MW of electric power by combustion of coal. As the largest coal facility owned by Duke Energy in the Carolinas, Belews Creek generates electricity, consuming coal and producing gypsum, typically on a continual basis.

Duke continues to diversify the mix of fuels used to generate electricity by making significant investments in renewable energy projects. In addition to solar, wind, and other renewable energy sources, Duke is testing the use of biomass mixed with coal at some of its traditional all-coal fired power plants.

The waste received by the landfill is gypsum produced by the FGD system. The quantity of material produced is determined by the sulfur content of the coal burned to generate electricity and on how much the station is used to generate electricity. Duke considers the sulfur content of coal when arranging fuel purchase contracts.

Waste Management Strategy – Plans for Waste Reduction and Disposal

The Belews Creek FGD system was designed specifically to produce gypsum that would be used in wallboard, reducing the quantity of material placed in the landfill. As presented in Table 1, the quantities of waste placed in the landfill for 2007-2008 and 2008-2009 were below the expected rate of waste placement. During this period, gypsum from Belews Creek was utilized in wallboard production. The regional economic downturn and availability of other gypsum sources led to increased placement of waste in the landfill during 2009-2010.

Duke's By-Products Management Group was developed by Duke to seek markets and applications for use of coal combustion by products. This group continuously works toward maximizing the use of coal combustion by products, such as gypsum.

Duke's plans for waste reduction for the FGD landfill are continuing to pursue the use of the gypsum produced at Belews Creek in wallboard and other products. Duke believes that an improving regional economy will increase the demand for gypsum, resulting in the use of this material as a wallboard product.

Duke's plans for disposal for the 5 year period (2007 – 2012) are to continue to place material in Phase I of the landfill until capacity of this phase is reached. Once the design capacity of the landfill is reached, the landfill will be closed. Duke is currently in the process of permitting an additional phase for this landfill.